

PICARD: Planning Information monitored Covariate Adjusted Randomized Designs

Installing and Using PICARD

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What Is PICARD?

- R/Shiny app for planning information monitored experiments
 - Single Analysis or Group Sequential Analyses
- Works for Continuous, Binary, and Ordinal Outcomes
 - Estimands: Difference in Means, Mann-Whitney (MW)
- Trial design, effect size, precision gain: sample sizes
 - Resource planning, *approximate* timing of analyses
- Use on ShinyApps.io or download for offline use
 - <https://josh-betz.shinyapps.io/PICARD>
 - <https://github.com/jbetz-jhu/PICARD>

Downloading & Running PICARD

- Install R, Rstudio
- Rstudio: File > New Project > Version Control > Git
- Repository URL: <https://github.com/jbetz-jhu/PICARD>
- Open app.R: install packages
- Run App button: Open in Browser
 - Problems? Open an issue!

How To Use PICARD

- Effect Size & Nuisance Parameters:
 - Mann-Whitney: PMF of outcomes or MW
- Design: Power, Familywise Type I Error, Sequential Analyses
 - O'Brien-Fleming, Pocock, Kim-DeMets, Hwang-Shi-DeCani
- Plots: Information vs. Sample Size
- Table: Analysis Times
- Resources: Plan assuming no benefit from covariates
- Sample sizes based on asymptotic approximations
 - Confirm with simulation: prior data available

Limitations & Future Directions

- Asymptotic approximations, Point Estimates, 1:1 trials
- Scenarios limited to prevent overplotting
 - Allow many, dynamically compare few at a time
- Future Directions:
 - Power, Average Sample Size, $\Pr\{\text{Max Sample Size}\}$
 - Simulation: Interval Estimates for Sample Sizes, Recruitment
 - Time-To-Event Outcomes & Estimands